Advancement Handbook for Electronics Technician (Surface)

This Advancement Handbook was last revised on: 20 August 1999

PREFACE

The purpose of the Advancement Handbook is to help you focus your preparation for Navywide advancement-in-rating examinations. The bibliographies (BIBs) together with this handbook form a comprehensive examination study package. Since this handbook provides skill and knowledge components for each paygrade of the ET rating, it helps you concentrate your study on those areas that may be tested. This feature will help you get the most out of your study time.

Each page in Parts 1 through 4 of this Advancement Handbook presents general skill areas, specific skill areas, the knowledge factors associated with each skill area, the pertinent references that address each skill, and the subject areas that may be covered on the examination. The skill statements describe the skills you are expected to perform for each paygrade. The skill statements are <u>cumulative</u>; that is, you are responsible for the skills for the paygrade you are competing for, your present paygrade, and all paygrades below.

Although this handbook is very comprehensive, it cannot cover all the tasks performed in the rating. As a result, the advancement examinations may contain questions more detailed than described in the *"Exam Expectations"* section of the skill areas.

Remember that advancement competition is keen, so your keys to advancement include not only comprehensive advancement examination study but also sustained superior performance.

Prepared by
Navy Advancement Center Department,
Naval Education and Training Professional
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Part 1

Advancement Handbook for ET3

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General ET *Skill Area*	**Radar Systems**
A *skill* you are expected to perform from the General Skill Area above:	Evaluate performance, troubleshoot, replace components, adjust, align, test, and operate radar equipment.
Knowledge you should have to perform this skill:	• AC and DC theory • Circuit protection • Schematic reading • Electronic emissions • Solid state devices • Power supplies • Amplifiers • Wave shaping • Wave generation • Wave propagation • Microwave principles • Modulation principles • Logic circuits • Test equipment • Radar principles • IFF principles • Test methods and practices • Electronic and electrical safety
References you should study to gain the knowledge you need to perform this skill:	• Navy Electricity and Electronics Training Series, Module 1, Chapters 1 through 3 (NAVEDTRA 172-01-00-98) • Navy Electricity and Electronics Training Series, Module 2, Chapters 1 through 5 (NAVEDTRA 172-02-00-98) • Navy Electricity and Electronics Training Series, Module 3, Chapters 1 through 3 (NAVEDTRA 172-03-00-98)

	- Navy Electricity and Electronics Training Series, Module 4, Chapters 1 through 3 (NAVEDTRA 172-04-00-98) - Navy Electricity and Electronics Training Series, Module 6, Chapters 1 through 3 (NAVEDTRA 172-06-00-98) - Navy Electricity and Electronics Training Series, Module 7, Chapters 1 through 4 (NAVEDTRA 172-07-00-98) - Navy Electricity and Electronics Training Series, Module 8, Chapters 1 through 3 (NAVEDTRA 172-08-00-98) - Navy Electricity and Electronics Training Series, Module 9, Chapters 1 through 4 (NAVEDTRA 172-09-00-98) - Navy Electricity and Electronics Training Series, Module 10, Chapters 1 through 4 (NAVEDTRA 172-10-00-98) - Navy Electricity and Electronics Training Series, Module 11, Chapters 1 through 3 (NAVEDTRA 172-11-00-98) - Navy Electricity and Electronics Training Series, Module 12, Chapters 1 through 3 (NAVEDTRA 172-12-00-98) - Navy Electricity and Electronics Training Series, Module 13, Chapters 1 through 3 (NAVEDTRA 172-13-00-98) - Navy Electricity and Electronics Training Series, Module 16, Chapters 1 through 7 (NAVEDTRA 172-16-00-98) - Navy Electricity and Electronics Training Series, Module 18, Chapters 1 through 4 (NAVEDTRA 172-18-00-98) - Navy Electricity and Electronics Training Series, Module 19, Chapter 1 (NAVEDTRA 172-19-00-98) - Navy Electricity and Electronics Training Series, Module 21, Chapter 1 (NAVEDTRA 172-21-00-98) - Electronics Technician, Volume 1, Chapters 1 through 3 (NAVEDTRA 12411) - Electronics Technician, Volume 4, Chapters 1 through 4 (NAVEDTRA 12414)

	• Electronics Technician, Volume 7, Chapters 1 through 3 (NAVEDTRA 12417) • Electronics Technician, Volume 8, Chapters 1 through 5 (NAVEDTRA 12418)
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about radar theory, operation, and maintenance. They will include radar theory, pulse forming, pulsewidth, repetition rates, power outputs, modulation, fault isolation, duplexers, range resolution, tr and atr tubes, echo box theory, mds, stc, modulators, radar indicators, timing circuits, IFF theory, microwave principles and waveguides. The questions may be of a general nature or specific to a type of radar system.

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General ET *Skill Area*	**Navigation systems**
A *skill* you are expected to perform from the General Skill Area above:	Evaluate performance, troubleshoot, replace components, adjust, align, test and operate electronic navigation systems.
Knowledge you should have to perform this skill:	• AC and DC theory • Circuit protection • Schematic reading • Electronic emissions • Solid state devices • Power supplies • Amplifiers • Wave shaping • Wave generation • Wave propagation • Microwave principles • Modulation principles • Logic circuits • Test equipment • Test methods and practices • Electronic and electrical safety
References you should study to gain the knowledge you need to perform this skill:	• Navy Electricity and Electronics Training Series, Module 1, Chapters 1 through 3 (NAVEDTRA 172-01-00-98) • Navy Electricity and Electronics Training Series, Module 2, Chapters 1 through 5 (NAVEDTRA 172-02-00-98) • Navy Electricity and Electronics Training Series, Module 3, Chapters 1 through 3 (NAVEDTRA 172-03-00-98) • Navy Electricity and Electronics Training Series, Module 4, Chapters 1 through 3 (NAVEDTRA 172-04-00-98)

	- Navy Electricity and Electronics Training Series, Module 6, Chapters 1 through 3 (NAVEDTRA 172-06-00-98) - Navy Electricity and Electronics Training Series, Module 7, Chapters 1 through 4 (NAVEDTRA 172-07-00-98) - Navy Electricity and Electronics Training Series, Module 8, Chapters 1 through 3 (NAVEDTRA 172-08-00-98) - Navy Electricity and Electronics Training Series, Module 9, Chapters 1 through 4 (NAVEDTRA 172-09-00-98) - Navy Electricity and Electronics Training Series, Module 10, Chapters 1 through 4 (NAVEDTRA 172-10-00-98) - Navy Electricity and Electronics Training Series, Module 11, (NAVEDTRA 172-11-00-98), Chapters 1 through 3 - Navy Electricity and Electronics Training Series, Module 12, Chapters 1 through 3 (NAVEDTRA 172-12-00-98) - Navy Electricity and Electronics Training Series, Module 13, Chapters 1 through 3 (NAVEDTRA 172-13-00-98) - Navy Electricity and Electronics Training Series, Module 16, Chapters 1 through 7 (NAVEDTRA 172-16-00-98) - Navy Electricity and Electronics Training Series, Module 19, Chapter 1 (NAVEDTRA 172-19-00-98) - Navy Electricity and Electronics Training Series, Module 20, Chapter 1 (NAVEDTRA 172-20-00-98) - Navy Electricity and Electronics Training Series, Module 21, Chapters 1 through 5 (NAVEDTRA 172-21-00-98) - Navy Electricity and Electronics Training Series, Module 24, Chapters 1 through 8 (NAVEDTRA 172-24-00-98) - Use and Care of Hand Tools and Measuring Tools, Chapters 1 through 3, 17, 22, 25, 52 (NAVEDTRA 12085)

	• Electronics Technician, Volume 1, Chapters 1 through 3 (NAVEDTRA 12411) • Electronics Technician, Volume 5, Chapters 1 through 2 (NAVEDTRA 12415) • Electronics Technician, Volume 7, Chapters 1 through 3 (NAVEDTRA 12417) • Metrology Automated System for Uniform Recall and Reporting, (MEASURE) Users Manual (OP43P6B) • Installation & Maintenance Books (IMB) 110, Section 2 (SE000-01-IMB-010) • Installation & Maintenance Books (IBM) 120, Parts 1 and 2 (SE000-01-IMB-010) • Installation & Maintenance Books (IMB) 100, Sections 1, 2, and 3 (SE000-01-IMB-010) • Installation & Maintenance Books (IMB) 160, Section 3 (SE000-01-IMB-010)
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about electronic navigation systems, operation, and maintenance. They will include ships inertial navigation system, GPS, and TACAN. Questions will be specific to the above systems.

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General ET *Skill Area*	**Communication Systems**
A *skill* you are expected to perform from the General Skill Area above:	Evaluate performance, troubleshoot, replace components, adjust, align, test and operate communications equipment.
Knowledge you should have to perform this skill:	• AC and DC theory • Circuit protection • Schematic reading • Electronic emissions • Solid state devices • Power supplies • Amplifiers • Wave shaping • Wave generation • Wave propagation • Modulation principles • Logic circuits • Test equipment • RF Communication principles • Digital data principles • Communications support equipment • Test methods and practices • Electronic and electrical safety
References you should study to gain the knowledge you need to perform this skill:	• Navy Electricity and Electronics Training Series, Module 1, Chapters 1 through 3 (NAVEDTRA 172-01-00-98) • Navy Electricity and Electronics Training Series, Module 2, Chapters 1 through 5 (NAVEDTRA 172-02-00-98) • Navy Electricity and Electronics Training Series, Module 3, Chapters 1 through 3 (NAVEDTRA 172-03-00-98)

	• Navy Electricity and Electronics Training Series, Module 4, Chapters 1 through 3 (NAVEDTRA 172-04-00-98) • Navy Electricity and Electronics Training Series, Module 6, Chapters 1 through 3 (NAVEDTRA 172-06-00-98) • Navy Electricity and Electronics Training Series, Module 7, Chapters 1 through 4 (NAVEDTRA 172-07-00-98) • Navy Electricity and Electronics Training Series, Module 8, Chapters 1 through 3 (NAVEDTRA 172-08-00-98) • Navy Electricity and Electronics Training Series, Module 9, Chapters 1 through 4 (NAVEDTRA 172-09-00-98) • Navy Electricity and Electronics Training Series, Module 10, Chapters 1 through 4 (NAVEDTRA 172-10-00-98) • Navy Electricity and Electronics Training Series, Module 12, (NAVEDTRA 172-12-00-98), Chapters 1 through 3 • Navy Electricity and Electronics Training Series, Module 13, Chapters 1 through 3 (NAVEDTRA 172-13-00-98) • Navy Electricity and Electronics Training Series, Module 14, Chapters 1 through 3 (NAVEDTRA 172-14-00-98) • Navy Electricity and Electronics Training Series, Module 16, Chapters 1 through 7 (NAVEDTRA 172-16-00-98) • Navy Electricity and Electronics Training Series, Module 17, Chapters 1 through 5 (NAVEDTRA 172-17-00-98) • Navy Electricity and Electronics Training Series, Module 19, Chapter 1 (NAVEDTRA 172-19-00-98) • Navy Electricity and Electronics Training Series, Module 20, Chapter 1 (NAVEDTRA 172-20-00-98) • Navy Electricity and Electronics Training Series, Module 21, Chapters 1 through 5 (NAVEDTRA 172-21-00-98)

	• Navy Electricity and Electronics Training Series, Module 22, Chapters 1 through 4 (NAVEDTRA 172-22-00-98) • Use and Care of Hand Tools and Measuring Tools, Chapters 1 through 3, 17, 22, 25, and 52 (NAVEDTRA 12085) • Electronics Technician, Volume 1, Chapters 1 through 3 (NAVEDTRA 12411) • Electronics Technician, Volume 3, Chapters 1 through 8 (NAVEDTRA 12413) • Electronics Technician, Volume 6, Chapters 1 through 13 (NAVEDTRA 12416)
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about communications theory, operation, and maintenance. They will include FM modulation, AM modulation, single sideband (SSB), amplifier theory and types, transmitters, receivers, patch panels, duplexing, couplers, multicouplers, heterodyning, oscillators, and satellite communication principles. The questions may be of a general nature or specific to a type of communication circuit.

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General ET *Skill Area*	**Auxiliary/Support Equipment**
A *skill* you are expected to perform from the General Skill Area above:	Evaluate performance, troubleshoot, replace modules and circuit cards, adjust, align, test and operate auxiliary and support systems.
Knowledge you should have to perform this skill:	- AC and DC theory - Circuit protection - Schematic reading - Electronic emissions - Generators and motors - Solid state devices - Power supplies - Amplifiers - Wave shaping - Wave generation - Wave propagation - Microwave principles - Modulation principles - Logic circuits - Test equipment - Radar principles - IFF principles - Test methods and practices - Electronic and electrical safety - RF Communication principles - Digital data principles - Support equipment
References you should study to gain the knowledge you need to perform this skill:	- Navy Electricity and Electronics Training Series, Module 1, Chapters 1 through 3 (NAVEDTRA 172-01-00-98) - Navy Electricity and Electronics Training Series, Module 2, Chapters 1 through 5 (NAVEDTRA 172-02-00-98)

	• Navy Electricity and Electronics Training Series, Module 3, Chapters 1 through 3 (NAVEDTRA 172-03-00-98)
• Navy Electricity and Electronics Training Series, Module 4, Chapters 1 through 3 (NAVEDTRA 172-04-00-98)
• Navy Electricity and Electronics Training Series, Module 5, Chapters 1 through 4 (NAVEDTRA 172-05-00-98)
• Navy Electricity and Electronics Training Series, Module 6, Chapters 1 through 3 (NAVEDTRA 172-06-00-98)
• Navy Electricity and Electronics Training Series, Module 7, Chapters 1 through 4 (NAVEDTRA 172-07-00-98)
• Navy Electricity and Electronics Training Series, Module 8, Chapters 1 through 3 (NAVEDTRA 172-08-00-98)
• Navy Electricity and Electronics Training Series, Module 9, Chapters 1 through 4 (NAVEDTRA 172-09-00-98)
• Navy Electricity and Electronics Training Series, Module 10, Chapters 1 through 4 (NAVEDTRA 172-10-00-98)
• Navy Electricity and Electronics Training Series, Module 11, Chapters 1 through 3 (NAVEDTRA 172-11-00-98)
• Navy Electricity and Electronics Training Series, Module 12, Chapters 1 through 3 (NAVEDTRA 172-12-00-98)
• Navy Electricity and Electronics Training Series, Module 13, Chapters 1 through 3 (NAVEDTRA 172-13-00-98)
• Navy Electricity and Electronics Training Series, Module 14, (NAVEDTRA 172-14-00-98), Chapters 1 through 3
• Navy Electricity and Electronics Training Series, Module 15, Chapters 1 through 3 (NAVEDTRA 172-15-00-98)
• Navy Electricity and Electronics Training Series, Module 16, Chapters 1 through 7 (NAVEDTRA 172-16-00-98)

	- Navy Electricity and Electronics Training Series, Module 17, Chapters 1 through 5 (NAVEDTRA 172-17-00-98) - Navy Electricity and Electronics Training Series, Module 18, Chapters 1 through 4 (NAVEDTRA 172-18-00-98) - Navy Electricity and Electronics Training Series, Module 19, Chapter 1 (NAVEDTRA 172-19-00-98) - Navy Electricity and Electronics Training Series, Module 20, Chapter 1 (NAVEDTRA 172-20-00-98) - Navy Electricity and Electronics Training Series, Module 21, Chapters 1 through 5 (NAVEDTRA 172-21-00-98) - Navy Electricity and Electronics Training Series, Module 22, Chapters 1 through 4 (NAVEDTRA 172-22-00-98) - Navy Electricity and Electronics Training Series, Module 23, Chapters 1 through 8 (NAVEDTRA 172-23-00-98) - Use and Care of Hand Tools and Measuring Tools, Chapters 1 through 3, 12, 22, 25, and 52 (NAVEDTRA 12085) - Electronics Technician, Volume 1, Chapters 1 through 3 (NAVEDTRA 12411) - Electronics Technician, Volume 2, Chapters 1 through 3 (NAVEDTRA 12412) - Electronics Technician, Volume 3, Chapters 1 through 8 (NAVEDTRA 12413) - Electronics Technician, Volume 4, Chapters 1 through 4 (NAVEDTRA 12414) - Electronics Technician, Volume 5, Chapters 1 through 2 (NAVEDTRA 12415) - Electronics Technician, Volume 6, Chapters 1 through 13 (NAVEDTRA 12416) - Electronics Technician, Volume 7, Chapters 1 through 3 (NAVEDTRA 12417) - Electronics Technician, Volume 9, Chapters 1 through 2 (NAVEDTRA 12419) - Basic Military Requirements, (NAVEDTRA 12043) - Military Requirements For Petty Officer Third Class (NAVEDTRA 12043)

Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about auxiliary and support equipment theory, operation, and maintenance. They will include switch types and theory, circuit breakers, relays, solenoids, synchro types and synchro theory.

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General ET *Skill Area*	**Computer/Automated Information Systems (AIS) Equipment**
A *skill* you are expected to perform from the General Skill Area above:	Evaluate performance, troubleshoot, adjust, align, test, and operate computer and computer information systems.
Knowledge you should have to perform this skill:	• AC and DC theory • Circuit protection • Schematic reading • Solid state devices • Power supplies • Amplifiers • Logic circuits • Test equipment • Test methods and practices
References you should study to gain the knowledge you need to perform this skill:	• Navy Electricity and Electronics Training Series, Module 1, Chapters 1 through 3 (NAVEDTRA 172-01-00-98) • Navy Electricity and Electronics Training Series, Module 2, (NAVEDTRA 172-02-00-98), Chapters 1 through 5 • Navy Electricity and Electronics Training Series, Module 3, Chapters 1 through 3 (NAVEDTRA 172-03-00-98) • Navy Electricity and Electronics Training Series, Module 4, Chapters 1 through 3 (NAVEDTRA 172-04-00-98) • Navy Electricity and Electronics Training Series, Module 7, Chapters 1 through 4 (NAVEDTRA 172-07-00-98) • Navy Electricity and Electronics Training Series, Module 8, Chapters 1 through 3 (NAVEDTRA 172-08-00-98)

	• Navy Electricity and Electronics Training Series, Module 9, Chapters 1 through 4 (NAVEDTRA 172-09-00-98) • Navy Electricity and Electronics Training Series, Module 13, Chapters 1 through 3 (NAVEDTRA 172-13-00-98) • Navy Electricity and Electronics Training Series, Module 14, Chapters 1 through 3 (NAVEDTRA 172-14-00-98) • Navy Electricity and Electronics Training Series, Module 16, Chapters 1 through 7 (NAVEDTRA 172-16-00-98) • Navy Electricity and Electronics Training Series, Module 19, Chapter 1 (NAVEDTRA 172-19-00-98) • Navy Electricity and Electronics Training Series, Module 20, Chapter 1 (NAVEDTRA 172-20-00-98) • Navy Electricity and Electronics Training Series, Module 21, Chapters 1 through 5 (NAVEDTRA 172-21-00-98) • Navy Electricity and Electronics Training Series, Module 22, (NAVEDTRA 172-22-00-98), Chapters 1 through 4 • Electronics Technician, Volume 1, Chapters 1 through 3 (NAVEDTRA 12411) • Electronics Technician, Volume 3, Chapters 1 through 8 (NAVEDTRA 12413) • Electronics Technician, Volume 6, Chapters 1 through 13 (NAVEDTRA 12416) • Information and Personnel Security Program Regulations, Parts 1 and 4 (SECNAVINST 5510)
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on computer theory, operation, and maintenance. They will include numbering systems, numbering system conversions, counters, logic gate circuits, Boolean expressions, truth tables, and flip flops.

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General ET *Skill Area*	**Electric/Electronic Maintenance**
A *skill* you are expected to perform from the General Skill Area above:	Evaluate performance, troubleshoot, replace components, adjust, align, test and operate electric/electronic equipment.
Knowledge you should have to perform this skill:	- AC and DC theory - Circuit protection - Schematic reading - Generators and motors - Solid state devices - Power supplies - Amplifiers - Wave shaping - Wave generation - Logic circuits - Test methods and practices - Electronic and electrical safety
References you should study to gain the knowledge you need to perform this skill:	- Navy Electricity and Electronics Training Series, Module 1, Chapters 1 through 3 (NAVEDTRA 172-01-00-98) - Navy Electricity and Electronics Training Series, Module 2, Chapters 1 through 5 (NAVEDTRA 172-02-00-98) - Navy Electricity and Electronics Training Series, Module 3, Chapters 1 through 3 (NAVEDTRA 172-03-00-98) - Navy Electricity and Electronics Training Series, Module 4, Chapters 1 through 3 (NAVEDTRA 172-04-00-98) - Navy Electricity and Electronics Training Series, Module 5, Chapters 1 through 4 (NAVEDTRA 172-05-00-98)

	- Navy Electricity and Electronics Training Series, Module 6, Chapters 1 through 3 (NAVEDTRA 172-06-00-98) - Navy Electricity and Electronics Training Series, Module 7, Chapters 1 through 4 (NAVEDTRA 172-07-00-98) - Navy Electricity and Electronics Training Series, Module 8, Chapters 1 through 3 (NAVEDTRA 172-08-00-98) - Navy Electricity and Electronics Training Series, Module 9, Chapters 1 through 4 (NAVEDTRA 172-09-00-98) - Navy Electricity and Electronics Training Series, Module 13, Chapters 1 through 3 (NAVEDTRA 172-13-00-98) - Navy Electricity and Electronics Training Series, Module 19, Chapter 1 (NAVEDTRA 172-19-00-98) - Navy Electricity and Electronics Training Series, Module 21, Chapter 1 (NAVEDTRA 172-21-00-98) - Electronics Technician, Volume 1, Chapters 1 through 3 (NAVEDTRA 12411)
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about electrical/electronic equipment theory, operation, and maintenance. They will include electronic casualty control transformer theory, clippers, voltage regulators, current regulation, multivibrators, transistor theory, operational amplifiers, audio amplifiers, coupling networks, impedance matching, power supplies, time constants, generators, motors, integrators, and differentiators.

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General ET *Skill Area*	**Test Equipment**
A *skill* you are expected to perform from the General Skill Area above:	Evaluate performance, troubleshoot, replace components, adjust, align, test and operate various test equipment.
Knowledge you should have to perform this skill:	• AC and DC theory • Circuit protection • Schematic reading • Electronic emissions • Solid state devices • Power supplies • Amplifiers • Wave shaping • Wave generation • Microwave principles • Modulation principles • Logic circuits • Test equipment • Test methods and practices
References you should study to gain the knowledge you need to perform this skill:	• Navy Electricity and Electronics Training Series, Module 1, Chapters 1 through 3 (NAVEDTRA 172-01-00-98) • Navy Electricity and Electronics Training Series, Module 2, Chapters 1 through 5 (NAVEDTRA 172-02-00-98) • Navy Electricity and Electronics Training Series, Module 3, Chapters 1 through 3 (NAVEDTRA 172-03-00-98) • Navy Electricity and Electronics Training Series, Module 4, Chapters 1 through 3 (NAVEDTRA 172-04-00-98)

	• Navy Electricity and Electronics Training Series, Module 6, Chapters 1 through 3 (NAVEDTRA 172-06-00-98) • Navy Electricity and Electronics Training Series, Module 7, Chapters 1 through 4 (NAVEDTRA 172-07-00-98) • Navy Electricity and Electronics Training Series, Module 8, Chapters 1 through 3 (NAVEDTRA 172-08-00-98) • Navy Electricity and Electronics Training Series, Module 9, Chapters 1 through 4 (NAVEDTRA 172-09-00-98) • Navy Electricity and Electronics Training Series, Module 10, Chapters 1 through 4 (NAVEDTRA 172-10-00-98) • Navy Electricity and Electronics Training Series, Module 11, Chapters 1 through 3 (NAVEDTRA 172-11-00-98) • Navy Electricity and Electronics Training Series, Module 12, Chapters 1 through 3 (NAVEDTRA 172-12-00-98) • Navy Electricity and Electronics Training Series, Module 13, Chapters 1 through 3 (NAVEDTRA 172-13-00-98) • Navy Electricity and Electronics Training Series, Module 16, Chapters 1 through 7 (NAVEDTRA 172-16-00-98) • Navy Electricity and Electronics Training Series, Module 19, Chapter 1 (NAVEDTRA 172-19-00-98) • Navy Electricity and Electronics Training Series, Module 20, Chapter 1 (NAVEDTRA 172-20-00-98) • Navy Electricity and Electronics Training Series, Module 21, Chapters 1 through 5 (NAVEDTRA 172-21-00-98) • Electronics Technician, Volume 1, Chapters 1 through 3 (NAVEDTRA 12411)

Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about test equipment operation and theory. They will include oscilloscopes, signal modulation, signal generators, multimeters, megohmmeters, voltmeters, meter movements, differential voltmeters, testing methods, ammeters, logic probes, attenuators, and milliwatt to dBm conversions.

Advancement Handbook for ET3

General ET *Skill Area*	**Technical Administration**
A *skill* you are expected to perform from the General Skill Area above:	Monitor and perform 3-M technical administration.
Knowledge you should have to perform this skill:	• Test methods and practices • 3-M principles
References you should study to gain the knowledge you need to perform this skill:	• Navy Electricity and Electronics Training Series, Module 19, Chapter 1 (NAVEDTRA 172-19-00-98) • Navy Electricity and Electronics Training Series, Module 20, Chapter 1 (NAVEDTRA 172-20-00-98) • Navy Electricity and Electronics Training Series, Module 21, Chapters 1 through 5 (NAVEDTRA 172-21-00-98) • Electronics Technician, Volume 2, Chapters 1 through 3 (NAVEDTRA 12412) • Military Requirements For Petty Officer Third Class (NAVEDTRA 12043) • Ships' Maintenance Material Management (3-M) Manual, Chapters 1 through 6 (OPNAVINST 4790.4)
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about the 3-M System, MDS, and PMS. They will include PMS schedules, MRC periodicities, MDS forms, LOEP composition, date codes, SPMIG makeup, classified MRCs, and 3-M symbols.

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General ET *Skill Area*	**Electronic Safety/Hazardous Material Safety**
A *skill* you are expected to perform from the General Skill Area above:	Evaluate performance and accuracy of shipboard electronic safety program.
Knowledge you should have to perform this skill:	• AC and DC theory • Circuit protection • Electronic emissions • Power supplies • Test methods and practices
References you should study to gain the knowledge you need to perform this skill:	• Navy Electricity and Electronics Training Series, Module 19, Chapter 1 (NAVEDTRA 172-19-00-98) • Navy Electricity and Electronics Training Series, Module 20, Chapter 1 (NAVEDTRA 172-20-00-98) • Navy Electricity and Electronics Training Series, Module 21, Chapters 1 through 5 (NAVEDTRA 172-21-00-98) • Electronics Technician, Volume 1, Chapters 1 through 3 (NAVEDTRA 12411) • Electronics Technician, Volume 2, Chapters 1 through 3 (NAVEDTRA 12412)
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about electrical and electronic safety and hazardous material use. They will include general electrical and electronic safety, use of personal protective equipment, electrical shock as related to muscle spasms, stowage of hazardous material, and uses of hazardous material.

Part 2

Advancement Handbook for ET2

Advancement Handbook for ET2

General ET *Skill Area*	**Radar Systems**
A *skill* you are expected to perform from the General Skill Area above:	Evaluate performance, troubleshoot, replace components, adjust, align, test and operate radar equipment.
Knowledge you should have to perform this skill:	• AC and DC theory • Circuit protection • Schematic reading • Electronic emissions • Solid state devices • Power supplies • Amplifiers • Wave shaping • Wave generation • Wave propagation • Microwave principles • Modulation principles • Logic circuits • Test equipment • Radar principles • IFF principles and components • Test methods and practices • Electronic and electrical safety
References you should study to gain the knowledge you need to perform this skill:	• Navy Electricity and Electronics Training Series, Module 1, Chapters 1 through 3 (NAVEDTRA 172-01-00-98) • Navy Electricity and Electronics Training Series, Module 2, Chapters 1 through 5 (NAVEDTRA 172-02-00-98) • Navy Electricity and Electronics Training Series, Module 3, Chapters 1 through 3 (NAVEDTRA 172-03-00-98)

	- Navy Electricity and Electronics Training Series, Module 4, Chapters 1 through 3 (NAVEDTRA 172-04-00-98) - Navy Electricity and Electronics Training Series, Module 6, Chapters 1 through 3 (NAVEDTRA 172-06-00-98) - Navy Electricity and Electronics Training Series, Module 7, Chapters 1 through 4 (NAVEDTRA 172-07-00-98) - Navy Electricity and Electronics Training Series, Module 8, Chapters 1 through 3 (NAVEDTRA 172-08-00-98) - Navy Electricity and Electronics Training Series, Module 9, Chapters 1 through 4 (NAVEDTRA 172-09-00-98) - Navy Electricity and Electronics Training Series, Module 10, (NAVEDTRA 172-10-00-98), Chapters 1 through 4 - Navy Electricity and Electronics Training Series, Module 11, (NAVEDTRA 172-11-00-98), Chapters 1 through 3 - Navy Electricity and Electronics Training Series, Module 12, Chapters 1 through 3 (NAVEDTRA 172-12-00-98) - Navy Electricity and Electronics Training Series, Module 13, Chapters 1 through 3 (NAVEDTRA 172-13-00-98) - Navy Electricity and Electronics Training Series, Module 16, Chapters 1 through 7 (NAVEDTRA 172-16-00-98) - Navy Electricity and Electronics Training Series, Module 18, Chapters 1 through 4 (NAVEDTRA 172-18-00-98) - Navy Electricity and Electronics Training Series, Module 19, Chapter 1 (NAVEDTRA 172-19-00-98) - Navy Electricity and Electronics Training Series, Module 21, Chapter 1 (NAVEDTRA 172-21-00-98) - Electronics Technician, Volume 1, Chapters 1 through 3 (NAVEDTRA 12411) - Electronics Technician, Volume 4, Chapters 1 through 4 (NAVEDTRA 12414)

	• Electronics Technician, Volume 7, Chapters 1 through 3 (NAVEDTRA 12417) • Electronics Technician, Volume 8, Chapters 1 through 5 (NAVEDTRA 12418)
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about radar theory, operation, and maintenance. They will include radar theory, pulse forming, pulsewidth, repetition rates, power outputs, modulation, fault isolation, duplexers, range resolution, tr and atr tubes, echo box theory, mds, stc, modulators, radar indicators, timing circuits, IFF theory, microwave principles and waveguides. The questions may be of a general nature or specific to a type of radar system.

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General ET *Skill Area*	**Auxiliary/Support Systems**
A *skill* you are expected to perform from the General Skill Area above:	Evaluate performance, troubleshoot, replace modules and circuit cards, adjust, align, test and operate auxiliary and support systems.
Knowledge you should have to perform this skill:	- AC and DC theory - Circuit protection - Schematic reading - Electronic cooling - Generators and motors - Solid state devices - Power supplies - Amplifiers - Logic circuits - Test equipment - Test methods and practices - Electronic and electrical safety - Support equipment
References you should study to gain the knowledge you need to perform this skill:	- Navy Electricity and Electronics Training Series, Module 1, Chapters 1 through 3 (NAVEDTRA 172-01-00-98) - Navy Electricity and Electronics Training Series, Module 2, Chapters 1 through 5 (NAVEDTRA 172-02-00-98) - Navy Electricity and Electronics Training Series, Module 3, Chapters 1 through 3 (NAVEDTRA 172-03-00-98) - Navy Electricity and Electronics Training Series, Module 4, Chapters 1 through 3 (NAVEDTRA 172-04-00-98) - Navy Electricity and Electronics Training Series, Module 5, Chapter 1 (NAVEDTRA 172-05-00-98)

	• Navy Electricity and Electronics Training Series, Module 12, Chapters 1 through 3 (NAVEDTRA 172-12-00-98) • Navy Electricity and Electronics Training Series, Module 13, Chapters 1 through 3 (NAVEDTRA 172-13-00-98) • Navy Electricity and Electronics Training Series, Module 15, Chapters 1 through 3 (NAVEDTRA 172-15-00-98) • Navy Electricity and Electronics Training Series, Module 19, Chapter 1 (NAVEDTRA 172-19-00-98) • Navy Electricity and Electronics Training Series, Module 20, Chapter 1 (NAVEDTRA 172-20-00-98) • Navy Electricity and Electronics Training Series, Module 21, Chapters 1 through 5 (NAVEDTRA 172-21-00-98) • Electronics Technician, Volume 1, Chapters 1 through 3 (NAVEDTRA 12411) • Electronics Technician, Volume 8, Chapters 1 through 5 , (NAVEDTRA 12418)
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about auxiliary and support equipment theory, operation, and maintenance. They will include solenoids, synchro types, synchro torque transmitters , cooling system theory, temperature and flow switches, water level indicators, expansion tank theory, soldering techniques, alarms and alarm indicators.

Advancement Handbook for ET2

General ET *Skill Area*	**Computer/Automated Information Systems (AIS) Equipment**
A *skill* you are expected to perform from the General Skill Area above:	Evaluate performance, troubleshoot, adjust, align, test, and operate computer and computer information systems.
Knowledge you should have to perform this skill:	• AC and DC theory • Circuit protection • Schematic reading • Solid state devices • Power supplies • Amplifiers • Logic circuits • Test equipment • Test methods and practices
References you should study to gain the knowledge you need to perform this skill:	• Navy Electricity and Electronics Training Series, Module 1, Chapters 1 through 3 (NAVEDTRA 172-01-00-98) • Navy Electricity and Electronics Training Series, Module 2, Chapters 1 through 5 (NAVEDTRA 172-02-00-98) • Navy Electricity and Electronics Training Series, Module 3, Chapters 1 through 3 (NAVEDTRA 172-03-00-98) • Navy Electricity and Electronics Training Series, Module 7, Chapters 1 through 4 (NAVEDTRA 172-07-00-98) • Navy Electricity and Electronics Training Series, Module 8, Chapters 1 through 3 (NAVEDTRA 172-08-00-98) • Navy Electricity and Electronics Training Series, Module 9, Chapters 1 through 4 (NAVEDTRA 172-09-00-98)

	• Navy Electricity and Electronics Training Series, Module 13, Chapters 1 through 3 (NAVEDTRA 172-13-00-98) • Navy Electricity and Electronics Training Series, Module 14, Chapters 1 through 3 (NAVEDTRA 172-14-00-98) • Navy Electricity and Electronics Training Series, Module 16, Chapters 1 through 7 (NAVEDTRA 172-16-00-98) • Navy Electricity and Electronics Training Series, Module 19, Chapter 1 (NAVEDTRA 172-19-00-98) • Navy Electricity and Electronics Training Series, Module 20, Chapter 1 (NAVEDTRA 172-20-00-98) • Navy Electricity and Electronics Training Series, Module 21, Chapters 1 through 5 (NAVEDTRA 172-21-00-98) • Navy Electricity and Electronics Training Series, Module 22, Chapters 1 through 4 (NAVEDTRA 172-22-00-98) • Navy Electricity and Electronics Training Series, Module 23, Chapters 1 through 8 (NAVEDTRA 172-23-00-98) • Electronics Technician, Volume 1, Chapters 1 through 3 (NAVEDTRA 12411) • Electronics Technician, Volume 3, Chapters 1 through 8 (NAVEDTRA 12413) • Electronics Technician, Volume 6, Chapters 1 through 13 (NAVEDTRA 12416), • Information and Personnel Security Program Regulations, Parts 1 and 4 (SECNAVINST 5510.)
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on computer theory, operation, and maintenance. They will include logic gate circuits, Boolean expressions, truth tables, flip-flops, adders, dual inline package (DIP) configurations, magnetic amplifiers, bit registers, data conversion, NAVMACS, CUDIX, link-11, link-4A, link-16, data terminals, JTIDS, local-area networks, magnetic tapes, magnetic disks, and computer configurations.

Advancement Handbook for ET2

General ET *Skill Area*	**Electric/Electronic Maintenance**
A *skill* you are expected to perform from the General Skill Area above:	Evaluate performance, troubleshoot, replace components, adjust, align, test and operate electric/electronic equipment.
Knowledge you should have to perform this skill:	• AC and DC theory • Circuit protection • Schematic reading • Generators and motors • Solid state devices • Power supplies • Amplifiers • Wave shaping • Wave generation • Logic circuits • Test methods and practices • Electronic and electrical safety
References you should study to gain the knowledge you need to perform this skill:	• Navy Electricity and Electronics Training Series, Module 1, Chapters 1 through 3 (NAVEDTRA 172-01-00-98) • Navy Electricity and Electronics Training Series, Module 2, Chapters 1 through 5 (NAVEDTRA 172-02-00-98) • Navy Electricity and Electronics Training Series, Module 3, Chapters 1 through 3 (NAVEDTRA 172-03-00-98) • Navy Electricity and Electronics Training Series, Module 4, Chapters 1 through 3 (NAVEDTRA 172-04-00-98) • Navy Electricity and Electronics Training Series, Module 5, Chapters 1 through 4 (NAVEDTRA 172-05-00-98)

	• Navy Electricity and Electronics Training Series, Module 6, Chapters 1 through 3 (NAVEDTRA 172-06-00-98) • Navy Electricity and Electronics Training Series, Module 7, Chapters 1 through 4 (NAVEDTRA 172-07-00-98) • Navy Electricity and Electronics Training Series, Module 8, Chapters 1 through 3 (NAVEDTRA 172-08-00-98) • Navy Electricity and Electronics Training Series, Module 9, Chapters 1 through 4 (NAVEDTRA 172-09-00-98) • Navy Electricity and Electronics Training Series, Module 13, Chapters 1 through 3 (NAVEDTRA 172-13-00-98) • Navy Electricity and Electronics Training Series, Module 19, Chapter 1 (NAVEDTRA 172-19-00-98) • Navy Electricity and Electronics Training Series, Module 21, Chapter 1 (NAVEDTRA 172-21-00-98) • Electronics Technician, Volume 1, Chapters 1 through 3 (NAVEDTRA 12411) • Electronics Technician, Volume 8, Chapters 1 through 5 (NAVEDTRA 12418)
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about electrical/electronic equipment theory, operation, and maintenance. They will include electronic casualty control theory, transformer theory, clippers, voltage regulators, current regulation, multivibrators, transistor theory, power dissipation, operational amplifiers, audio amplifiers, coupling networks, impedance matching, power supplies, time constants, generators, motors, integrators, and differentiators.

Advancement Handbook for ET2

General ET *Skill Area*	**Test Equipment**
A *skill* you are expected to perform from the General Skill Area above:	Evaluate performance, troubleshoot, replace components, adjust, align, test and operate various test equipment.
Knowledge you should have to perform this skill:	• AC and DC theory • Circuit protection • Schematic reading • Electronic emissions • Solid state devices • Power supplies • Amplifiers • Wave shaping • Wave generation • Microwave principles • Modulation principles • Logic circuits • Test equipment • Test methods and practices
References you should study to gain the knowledge you need to perform this skill:	• Navy Electricity and Electronics Training Series, Module 1, Chapters 1 through 3 (NAVEDTRA 172-01-00-98) • Navy Electricity and Electronics Training Series, Module 3, Chapters 1 through 3 (NAVEDTRA 172-03-00-98) • Navy Electricity and Electronics Training Series, Module 4, Chapters 1 through 3 (NAVEDTRA 172-04-00-98) • Navy Electricity and Electronics Training Series, Module 6, Chapters 1 through 3 (NAVEDTRA 172-06-00-98) • Navy Electricity and Electronics Training Series, Module 7, Chapters 1 through 4 (NAVEDTRA 172-07-00-98)

	• Navy Electricity and Electronics Training Series, Module 8, Chapters 1 through 3 (NAVEDTRA 172-08-00-98) • Navy Electricity and Electronics Training Series, Module 9, Chapters 1 through 4 (NAVEDTRA 172-09-00-98) • Navy Electricity and Electronics Training Series, Module 12, Chapters 1 through 3 (NAVEDTRA 172-12-00-98) • Navy Electricity and Electronics Training Series, Module 13, Chapters 1 through 3 (NAVEDTRA 172-13-00-98) • Navy Electricity and Electronics Training Series, Module 16, Chapters 1 through 7 (NAVEDTRA 172-16-00-98) • Navy Electricity and Electronics Training Series, Module 19, Chapter 1 (NAVEDTRA 172-19-00-98) • Navy Electricity and Electronics Training Series, Module 20, Chapter 1 (NAVEDTRA 172-20-00-98) • Navy Electricity and Electronics Training Series, Module 21, Chapters 1 through 5 (NAVEDTRA 172-21-00-98) • Electronics Technician, Volume 1, Chapters 1 through 3 (NAVEDTRA 12411)
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about test equipment operation and theory. They will include time domain reflectometers (TDR), spectrum analyzers, oscilloscopes, signal modulation, signal generators, multimeters, voltmeters, meter movements, differential voltmeters, testing methods, ammeters, logic probes, attenuators, and SCAT codes.

Advancement Handbook for ET2

General ET *Skill Area*	**Technical Administration**
A *skill* you are expected to perform from the General Skill Area above:	Monitor and perform electronic technical administration.
Knowledge you should have to perform this skill:	• Test methods and practices • 3-M principles
References you should study to gain the knowledge you need to perform this skill:	• Navy Electricity and Electronics Training Series, Module 19, Chapter 1 (NAVEDTRA 172-19-00-98) • Navy Electricity and Electronics Training Series, Module 20, Chapter 1 (NAVEDTRA 172-20-00-98) • Navy Electricity and Electronics Training Series, Module 21, Chapters 1 through 5 (NAVEDTRA 172-21-00-98) • Electronics Technician, Volume 2, Chapters 1 through 3 (NAVEDTRA 12412) • Military Requirements For Petty Officer Second Class (NAVEDTRA 12043) • Ships' Maintenance Material Management (3-M) Manual, Chapters 1 through 6 (OPNAVINST 4790.4) • Coordinated Shipboard Allowance List Use and Maintenance Manual, Chapters 1 through 5 (SPCCINST 4441.170)
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about the 3-M System, MDS, and PMS. They will include PMS schedules, MRC periodicities, EGLs, COSAL information, APLs, AELs, feedback reports, SPCC data, SCLSIS, MDS forms, LOEP composition, and classified MRCs.

Part 3

Advancement Handbook for ET1

Advancement Handbook for ET1

General ET *Skill Area*	**Computer/Automated Information Systems (AIS) Equipment**
A *skill* you are expected to perform from the General Skill Area above:	Evaluate performance, troubleshoot, adjust, align, test, and operate computer and computer information systems.
Knowledge you should have to perform this skill:	• AC and DC theory • Circuit protection • Schematic reading • Solid state devices • Power supplies • Amplifiers • Logic circuits • Test equipment • Test methods and practices
References you should study to gain the knowledge you need to perform this skill:	• Navy Electricity and Electronics Training Series, Module 1, Chapters 1 through 3 (NAVEDTRA 172-01-00-98) • Navy Electricity and Electronics Training Series, Module 2, Chapters 1 through 5 (NAVEDTRA 172-02-00-98) • Navy Electricity and Electronics Training Series, Module 3, Chapters 1 through 3 (NAVEDTRA 172-03-00-98) • Navy Electricity and Electronics Training Series, Module 7, Chapters 1 through 4 (NAVEDTRA 172-07-00-98) • Navy Electricity and Electronics Training Series, Module 8, Chapters 1 through 3 (NAVEDTRA 172-08-00-98) • Navy Electricity and Electronics Training Series, Module 9, Chapters 1 through 4 (NAVEDTRA 172-09-00-98)

	• Navy Electricity and Electronics Training Series, Module 13, Chapters 1 through 3 (NAVEDTRA 172-13-00-98) • Navy Electricity and Electronics Training Series, Module 14, Chapters 1 through 3 (NAVEDTRA 172-14-00-98) • Navy Electricity and Electronics Training Series, Module 16, Chapters 1 through 7 (NAVEDTRA 172-16-00-98) • Navy Electricity and Electronics Training Series, Module 19, Chapter 1 (NAVEDTRA 172-19-00-98) • Navy Electricity and Electronics Training Series, Module 20, Chapter 1 (NAVEDTRA 172-20-00-98) • Navy Electricity and Electronics Training Series, Module 21, Chapters 1 through 5 (NAVEDTRA 172-21-00-98) • Navy Electricity and Electronics Training Series, Module 22, Chapters 1 through 4 (NAVEDTRA 172-22-00-98) • Navy Electricity and Electronics Training Series, Module 23, Chapters 1 through 8 (NAVEDTRA 172-23-00-98) • Electronics Technician, Volume 1, Chapters 1 through 3 (NAVEDTRA 12411) • Electronics Technician, Volume 6, Chapters 1 through 13 (NAVEDTRA 12416) • Information and Personnel Security Program Regulations, Parts 1 and 4 (SECNAVINST 5510.)
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on computer theory, operation, and maintenance. They will include logic gate circuits, Boolean expressions, truth tables, flip-flops, adders, dual inline package (DIP) configurations, IC chip theory, magnetic amplifiers, bit registers, data conversion, data terminals, local-area networks, magnetic tapes, magnetic disks, and computer configurations.

Advancement Handbook for ET1

General ET *Skill Area*	**Electric/Electronic Maintenance**
A *skill* you are expected to perform from the General Skill Area above:	Evaluate performance, troubleshoot, replace components, adjust, align, test and operate electric/electronic equipment.
Knowledge you should have to perform this skill:	• AC and DC theory • Circuit protection • Schematic reading • Generators and motors • Solid state devices • Power supplies • Amplifiers • Wave shaping • Wave generation • Logic circuits • Test methods and practices • Electronic and electrical safety
References you should study to gain the knowledge you need to perform this skill:	• Navy Electricity and Electronics Training Series, Module 1, Chapters 1 through 3 (NAVEDTRA 172-01-00-98) • Navy Electricity and Electronics Training Series, Module 2, Chapters 1 through 5 (NAVEDTRA 172-02-00-98) • Navy Electricity and Electronics Training Series, Module 3, Chapters 1 through 3 (NAVEDTRA 172-03-00-98) • Navy Electricity and Electronics Training Series, Module 4, Chapters 1 through 3 (NAVEDTRA 172-04-00-98) • Navy Electricity and Electronics Training Series, Module 5, Chapters 1 through 4 (NAVEDTRA 172-05-00-98)

	- Navy Electricity and Electronics Training Series, Module 6, Chapters 1 through 3 (NAVEDTRA 172-06-00-98) - Navy Electricity and Electronics Training Series, Module 7, Chapters 1 through 4 (NAVEDTRA 172-07-00-98) - Navy Electricity and Electronics Training Series, Module 8, Chapters 1 through 3 (NAVEDTRA 172-08-00-98) - Navy Electricity and Electronics Training Series, Module 9, Chapters 1 through 4 (NAVEDTRA 172-09-00-98) - Navy Electricity and Electronics Training Series, Module 13, Chapters 1 through 3 (NAVEDTRA 172-13-00-98) - Navy Electricity and Electronics Training Series, Module 19, Chapter 1 (NAVEDTRA 172-19-00-98) - Navy Electricity and Electronics Training Series, Module 21, Chapter 1 (NAVEDTRA 172-21-00-98) - Electronics Technician, Volume 1, Chapters 1 through 3 (NAVEDTRA 12411) - Electronics Technician, Volume 8, Chapters 1 through 5 (NAVEDTRA 12418)
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about electrical/electronic equipment theory, operation, and maintenance. They will include electronic casualty control responsibilities, transformer theory, voltage regulators, current regulation, multivibrators, transistor theory, power dissipation, operational amplifiers, audio amplifiers, coupling networks, impedance matching, power supplies, time constants, generators, and motors.

Advancement Handbook for ET1

General ET *Skill Area*	**Test Equipment**
A *skill* you are expected to perform from the General Skill Area above:	Evaluate performance, troubleshoot, replace components, adjust, align, test and operate various test equipment.
Knowledge you should have to perform this skill:	• AC and DC theory • Circuit protection • Schematic reading • Electronic emissions • Solid state devices • Power supplies • Amplifiers • Wave shaping • Wave generation • Microwave principles • Modulation principles • Logic circuits • Test equipment • Test methods and practices
References you should study to gain the knowledge you need to perform this skill:	• Navy Electricity and Electronics Training Series, Module 1, Chapters 1 through 3 (NAVEDTRA 172-01-00-98) • Navy Electricity and Electronics Training Series, Module 2, Chapters 1 through 5 (NAVEDTRA 172-02-00-98) • Navy Electricity and Electronics Training Series, Module 3, Chapters 1 through 3 (NAVEDTRA 172-03-00-98) • Navy Electricity and Electronics Training Series, Module 4, Chapters 1 through 3 (NAVEDTRA 172-04-00-98) • Navy Electricity and Electronics Training Series, Module 6, Chapters 1 through 3 (NAVEDTRA 172-06-00-98)

	• Navy Electricity and Electronics Training Series, Module 7, Chapters 1 through 4 (NAVEDTRA 172-07-00-98) • Navy Electricity and Electronics Training Series, Module 8, Chapters 1 through 3 (NAVEDTRA 172-08-00-98) • Navy Electricity and Electronics Training Series, Module 9, Chapters 1 through 4 (NAVEDTRA 172-09-00-98) • Navy Electricity and Electronics Training Series, Module 16, Chapters 1 through 7 (NAVEDTRA 172-16-00-98) • Navy Electricity and Electronics Training Series, Module 19, Chapter 1 (NAVEDTRA 172-19-00-98) • Navy Electricity and Electronics Training Series, Module 20, Chapter 1 (NAVEDTRA 172-20-00-98) • Navy Electricity and Electronics Training Series, Module 21, Chapters 1 through 5 (NAVEDTRA 172-21-00-98) • Electronics Technician, Volume 1, Chapters 1 through 3 (NAVEDTRA 12411)
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about test equipment operation and theory. They will include MEASURE reporting, paper troubleshooting, time domain reflectometers (TDR), spectrum analyzers, oscilloscopes, signal modulation, signal generators, multimeters, voltmeters, meter movements, differential voltmeters, testing methods, attenuators, and SCAT codes.

Advancement Handbook for ET1

General ET *Skill Area*	**Technical Administration**
A *skill* you are expected to perform from the General Skill Area above:	Monitor and perform electronics division technical administration.
Knowledge you should have to perform this skill:	• Test methods and practices • 3-M administration • Security classifications • Combat systems configuration • CASREP procedures
References you should study to gain the knowledge you need to perform this skill:	• Navy Electricity and Electronics Training Series, Module 19, Chapter 1 (NAVEDTRA 172-19-00-98) • Navy Electricity and Electronics Training Series, Module 20, Chapter 1 (NAVEDTRA 172-20-00-98) • Navy Electricity and Electronics Training Series, Module 21, Chapters 1 through 5 (NAVEDTRA 172-21-00-98) • Electronics Technician, Volume 2, Chapters 1 through 3 (NAVEDTRA 12412) • Military Requirements For Petty Officer Second Class (NAVEDTRA 12043) • Ships' Maintenance Material Management (3-M) Manual, Chapters 1 through 6 (OPNAVINST 4790.4) • Coordinated Shipboard Allowance List Use and Maintenance Manual, Chapters 1 through 5 (SPCCINST 4441.170) • Electronic Technician Supervisor, Chapters 1 through 8 (NAVEDTRA 12410) • Personnel Security Program (PSP) Regulations, (SECNAVINST 5510.30A)

Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about the 3-M System administration, MDS, PMS, and Electronics Division administration. They will include PMS schedules, MRC periodicities, COSAL information, SPCC data, SCLSIS, MDS forms, security classifications, security containers, combat systems administration, and casualty reporting system.

Part 4

Advancement Handbook for ETC

Advancement Handbook for ETC

General ET *Skill Area*	**Electric/Electronic Maintenance**
A *skill* you are expected to perform from the General Skill Area above:	Evaluate performance of electric and electronic equipment and perform inspections and training.
Knowledge you should have to perform this skill:	• Combat systems practices • EMI principles • Schematic reading • Test methods and practices • Electronic and electrical safety
References you should study to gain the knowledge you need to perform this skill:	• Navy Electricity and Electronics Training Series, Module 19, Chapter 1 (NAVEDTRA 172-19-00-98) • Navy Electricity and Electronics Training Series, Module 21, Chapter 1 (NAVEDTRA 172-21-00-98) • Electronics Technician, Volume 1, Chapters 1 through 3 (NAVEDTRA 12411) • Electronics Technician, Volume 2, Chapters 1 through 3 (NAVEDTRA 12412) • Electronics Technician, Volume 7, Chapters 1 through 3 (NAVEDTRA 12417) • Electronic Technician Supervisor, Chapters 1 through 8 (NAVEDTRA 12410)
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about Electronic Division and Combat System department electrical/electronic systems and inspections. They will include training, EMI, SERT, and safety programs and requirements.

Advancement Handbook for ETC

General ET *Skill Area*	**Test Equipment**
A *skill* you are expected to perform from the General Skill Area above:	Evaluate performance, monitor calibration program, review MEASURE forms, and monitor SCAT requirements for test equipment.
Knowledge you should have to perform this skill:	• Schematic reading • Solid state devices • Power supplies • Wave shaping • Wave generation • Logic circuits • Test equipment • Test methods and practices
References you should study to gain the knowledge you need to perform this skill:	• Navy Electricity and Electronics Training Series, Module 4, Chapters 1 through 3 (NAVEDTRA 172-04-00-98) • Navy Electricity and Electronics Training Series, Module 7, Chapters 1 through 4 (NAVEDTRA 172-07-00-98) • Navy Electricity and Electronics Training Series, Module 9, Chapters 1 through 4, (NAVEDTRA 172-09-00-98) • Navy Electricity and Electronics Training Series, Module 13, Chapters 1 through 3 (NAVEDTRA 172-13-00-98) • Navy Electricity and Electronics Training Series, Module 16, (NAVEDTRA 172-16-00-98), Chapters 1 through 7 • Navy Electricity and Electronics Training Series, Module 21, Chapters 1 through 5 (NAVEDTRA 172-21-00-98) • Electronics Technician, Volume 1, Chapters 1 through 3 (NAVEDTRA 12411)

	• Measure Users Manual, Chapters 1 through 3 (OP43P6B)
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about test equipment administration operation and theory. They will include oscilloscope operations, MEASURE reporting, forms, calibration codes, GPETE, GINO equipment, equipment procurement, and types of calibration facilities.

Advancement Handbook for ETC

General ET *Skill Area*	**Technical Administration**
A *skill* you are expected to perform from the General Skill Area above:	Monitor and perform Electronic Division administration.
Knowledge you should have to perform this skill:	• Test methods and practices • 3-M administration • Security classifications • Combat systems configuration • CASREP procedures
References you should study to gain the knowledge you need to perform this skill:	• Navy Electricity and Electronics Training Series, Module 19, Chapter 1 (NAVEDTRA 172-19-00-98) • Navy Electricity and Electronics Training Series, Module 20, Chapter 1 (NAVEDTRA 172-20-00-98) • Navy Electricity and Electronics Training Series, Module 21, Chapters 1 through 5 (NAVEDTRA 172-21-00-98) • Electronics Technician, Volume 2, Chapters 1 through 3 (NAVEDTRA 12412) • Military Requirements For Petty Officer Second Class (NAVEDTRA 12043) • Ships' Maintenance Material Management (3-M) Manual, Chapters 1 through 6 (OPNAVINST 4790.4) • Coordinated Shipboard Allowance List Use and Maintenance Manual, Chapters 1 through 5 (SPCCINST 4441.170) • Electronic Technician Supervisor, Chapters 1 through 8 (NAVEDTRA 12410) • Personnel Security Program (PSP) Regulations, (SECNAVINST 5510.30A)

Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about the 3-M System administration and Electronics Division administration. They will include field changes, overhaul procedures, supply support, training, COSAL information, SPCC data, SCLSIS, security, combat systems administration and casualty reporting system.

Appendix A

References Used in This Advancement Handbook

Rating	Short Title	Long Title	Chapters/ Paragraphs	Stocking Point
ET3	NAVEDTRA 12085	Use and Care of Hand Tools and Measuring Tools	Chapters 1, 2, 3, 17, 22, 25, and 52.	Note 1
	NAVEDTRA 12043	Basic Military Requirements	All Chapters	Note 1
	NAVEDTRA 12044	Military Requirements For Petty Officer Third Class	All Chapters	Note 1
	NAVEDTRA 12411	Electronics Technician, Volume 1, Safety	Chapters 1 through 3	Note 1
	NAVEDTRA 12412	Electronics Technician, Volume 2, Administration	Chapters 1 through 3	Note 1
	NAVEDTRA 12413	Electronics Technician, Volume 3, Communications Systems	Chapters 1 through 8	Note 1
	NAVEDTRA 12414	Electronics Technician, Volume 4, Radar Systems	Chapters 1 through 4	Note 1
	NAVEDTRA 12415	Electronics Technician, Volume 5, Navigation Systems	Chapters 1 and 2	Note 1
	NAVEDTRA 12416	Electronics Technician, Volume 6, Digital Data Systems	Chapters 1 through 13	Note 1
	NAVEDTRA 12417	Electronics Technician, Volume 7, Antennas and Wave Propagation	Chapters 1 through 3	Note 1
	NAVEDTRA 12419	Electronics Technician, Volume 9, Electro-Optics	Chapters 1 and 2	Note 1
	NAVEDTRA 172-01-00-98	Navy Electricity and Electronics Training Series, Module 1	Chapters 1 through 3	Note 1

Rating	Short Title	Long Title	Chapters/ Paragraphs	Stocking Point
ET3 (Cont)	NAVEDTRA 172-02-00-98	Navy Electricity and Electronics Training Series, Module 2	Chapters 1 through 5	Note 1
	NAVEDTRA 172-03-00-98	Navy Electricity and Electronics Training Series, Module 3	Chapters 1 through 3	Note 1
	NAVEDTRA 172-04-00-98	Navy Electricity and Electronics Training Series, Module 4	Chapters 1 through 3	Note 1
	NAVEDTRA 172-05-00-98	Navy Electricity and Electronics Training Series, Module 5	Chapters 1 through 4	Note 1
	NAVEDTRA 172-06-00-98	Navy Electricity and Electronics Training Series, Module 6	Chapters 1 through 3	Note 1
	NAVEDTRA 172-07-00-98	Navy Electricity and Electronics Training Series, Module 7	Chapters 1 through 4	Note 1
	NAVEDTRA 172-08-00-98	Navy Electricity and Electronics Training Series, Module 8	Chapters 1 through 3	Note 1
	NAVEDTRA 172-09-00-98	Navy Electricity and Electronics Training Series, Module 9	Chapters 1 through 4	Note 1
	NAVEDTRA 172-10-00-98	Navy Electricity and Electronics Training Series, Module 10	Chapters 1 through 4	Note 1
	NAVEDTRA 172-11-00-98	Navy Electricity and Electronics Training Series, Module 11	Chapters 1 through 3	Note 1
	NAVEDTRA 172-12-00-98	Navy Electricity and Electronics Training Series, Module 12	Chapters 1 through 3	Note 1
	NAVEDTRA 172-13-00-98	Navy Electricity and Electronics Training Series, Module 13	Chapters 1 through 3	Note 1
	NAVEDTRA 172-14-00-98	Navy Electricity and Electronics Training Series, Module 14	Chapters 1 through 3	Note 1
	NAVEDTRA 172-15-00-98	Navy Electricity and Electronics Training Series, Module 15	Chapters 1 through 3	Note 1

Rating	Short Title	Long Title	Chapters/ Paragraphs	Stocking Point
ET3 (Cont)	NAVEDTRA 172-16-00-98	Navy Electricity and Electronics Training Series, Module 16	Chapters 1 through 7	Note 1
	NAVEDTRA 172-17-00-98	Navy Electricity and Electronics Training Series, Module 17	Chapters 1 through 5	Note 1
	NAVEDTRA 172-18-00-98	Navy Electricity and Electronics Training Series, Module 18	Chapters 1 through 4	Note 1
	NAVEDTRA 172-19-00-98	Navy Electricity and Electronics Training Series, Module 19	Chapter 1	Note 1
	NAVEDTRA 172-20-00-98	Navy Electricity and Electronics Training Series, Module 20	Chapter 1	Note 1
	NAVEDTRA 172-21-00-98	Navy Electricity and Electronics Training Series, Module 21	Chapters 1 through 5	Note 1
	NAVEDTRA 172-22-00-98	Navy Electricity and Electronics Training Series, Module 22	Chapters 1 through 4	Note 1
	NAVEDTRA 172-23-00-98	Navy Electricity and Electronics Training Series, Module 23	Chapters 1 through 8	Note 1
	NAVEDTRA 172-24-00-98	Navy Electricity and Electronics Training Series, Module 24	Chapters 1 through 8	Note 1
	NAVSEA SE000-01-IMB-010	Installation and Maintenance Books (IMB) 100	Sections 1, 2, and 3	Note 1
	NAVSEA SE000-01-IMB-010	Installation and Maintenance Books (IMB) 110	Section 2	Note 1
	NAVSEA SE000-01-IMB-010	Installation and Maintenance Books (IMB) 120	Parts 1 and 2	Note 1
	NAVSEA SE000-01-IMB-010	Installation and Maintenance Books (IMB) 160	Section 3	Note 1
	OPNAVINST 4790.4	Ships' Maintenance Material Management (3-M) Manual	Chapters 1 through 6	Note 2

Rating	Short Title	Long Title	Chapters/ Paragraphs	Stocking Point
ET3 (Cont)	SECNAVINST 5510.30A	Department of the Navy (DON) Personnel Security Program (PSP) Regulation	Parts 1 through 4	Note 2
ET2	NAVEDTRA 12045	Military Requirements For Petty Office Second Class	All Chapters	Note 1
	NAVEDTRA 12410	Electronics Technician Supervisor	Chapters 1 through 8	Note 1
	NAVEDTRA 12418	Electronics Technician, Volume 8, Support Systems	Chapters 1 through 5	Note 1
	NS 0948-LP-228-8010	Technicians Handbook, Basic Cooling Systems for Electronics	All Chapters	Note 1
	SPCCINST 4441.170	Coordinated Shipboard Allowance List Use and Maintenance Manual	Chapters 1 through 10	Note 3
ET1	NAVEDTRA 12046	Military Requirements for Petty Officer First Class	All Chapters	Note 1
	OPNAV 43P6B	MEASURE Users Manual	Sections 1 through 3	Note 2
	NS 0910-LP-278-2100	Ship Configuration and Logistics Support Information System (SCLSIS) Organizational Guide	Sections 1 through 3	Note 1
	NS 0910-LP-258-6300	Technical Specification 9090-700B Ship Configuration and Logistics Support Information System (SCLSIS) Part B	Sections 1 through 4	Note 1

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